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Los Angeles' Cycling Revolution: Paving the Way for a New City

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Executive Summary:

Los Angeles has long been considered to be the city of cars, suburbs, beaches and entertainment. For many years, popular culture, as well as planners and developers who put stock in the region's ever-sprawling expansion through the continued construction of parking lots, boulevards and freeways, have embraced the stereotype of the automobile city. Despite the prominence of the car in Los Angeles's public consciousness, a modestly emerging revolution, also apparent in many other cities across the United States, has created a burgeoning group of political, activist bicyclists. While a number of the country's premier cities, such as New York, San Francisco, Portland and Minneapolis, have gone to great lengths to acknowledge and improve the safety of these cyclists through newly constructed bike networks and public safety campaigns, Los Angeles has, until recently, lagged woefully behind her peers.

On March 1st, 2011, the City approved the 2010 Los Angeles Bicycle Plan, an ambitious document created collaboratively by the Department of City Planning, the Department of Transportation and cycling advocacy groups, among others. The plan lays out a blueprint for a decidedly different Los Angeles in terms of its

commitment to alternative transportation, specifically the bicycle. This study aims to assess Los Angeles' current bicycle network, the various safety hazards that presently exist for cyclists in the City, potential solutions to these risks and how effectively the 2010 Bike Plan addresses these concerns. A more comprehensive bike network in Los Angeles will increase the safety of cyclists in the city, attracting more bikers to the street, which, in turn, creates positive feedback in a safer and more sustainable city.

An Introduction

This research project is an especially personal one for me, one in which I have a deeply vested interested in the results and its effect on the implementation of future urban cycling infrastructure. Though I've long been a cycling enthusiast, I found my real passion for the bicycle upon moving to Los Angeles, which, I'm sure, comes as a surprise to many. Prior to arriving at Occidental College I assumed I would not be putting my bike to use in Los Angeles – that destinations were too far apart and roads too inhospitable for me to have any significant use for my bicycle in the city. Over the course of my freshman year, I bought into this myth, and my bike remained woefully underused. As a first year student without a car, I felt confined to campus and that I was only experiencing a few square miles of the vast and vibrant city in which I attended school. I distinctly remember wanting to transfer to a school in another city, one that was more pedestrian friendly and afforded a more comprehensive public transportation system. Luckily, near the end of my freshman year, I had two formative experiences that kept me in Los Angeles.

The first of these pivotal moments that kept me at Occidental was meeting Erica Fick, who at the time was an Urban and Environmental Policy senior, through a mutual friend. Upon meeting Erica, I was woefully unaware of the fact that she was working on a senior comprehensive project examining the cycling community in Los Angeles, but she did instill in me some enthusiasm for the city, and more importantly, told me about the Urban and Environmental Policy major. Hearing about the major and its curriculum excited me as someone approaching the end of my first year of college still unsure of what I wanted to study, and prompted be to enroll in Bob Gottlieb's Urban and Environmental Policy 101 course. Ironically, the second crucial incident that helped to keep me in Los Angeles was a phone call from a friend back home in Wisconsin, informing me that he was planning on selling his car come summertime, as he was planning on moving to New York City. He offered to sell me his car for a low price, and with that, I decided to officially stick around Los Angeles for another year.

I returned to Los Angeles just a few short weeks after finishing my freshman year, moving into a house in Eagle Rock. With my car and my new off-campus living arrangement, I was dedicated to investing myself in and exploring what Los Angeles had to offer. Though I had no real intention of putting it to use now that I had a car, something compelled me to bring my bike back to Los Angeles with me – something just did not feel right about abandoning it altogether. Though it spent most of the summer unassembled, it turns out that bringing my bicycle back to Los Angeles would be a very formative decision for me. Come the start of my sophomore year in the fall, I attended UEP 101, and distinctly remember the feeling of confusion I felt

during the first few class periods. I couldn't adequately grasp what topic it was that our class was discussing – one minute I though it was environmental issues, the next social concerns and at other times history. Previously my education had been divided into such neat, discrete units of study (mathematics, history, science etc.) that I felt disoriented by this course that seemed determined to cross the borders of many of these topics in favor of a more holistic view of the world. Despite my apprehension, there was something appealing about the course, so I kept coming back. I distinctly remember picking up Professor Gottlieb's *Reinventing Los Angeles: Nature and Community in the Global City* throughout the course of the semester and being captivated by the image of a group of cyclists riding on the Interstate 110. During our discussion of the chapters "Re-Envisioning the Los Angeles River" and "Cars and Freeways in the City" I learned about the ArroyoFest Freeway Walk and Bike Ride (the event from which the book cover is taken) and the LA River bike path. Through these conversations, I gradually began to accept that cycling might have a place in Los Angeles and that it was time I give it a try for myself.

Over the course of that year I started riding my bike around the city, first challenging myself to run errands in the neighborhood without my car and next, to ride to the LA River bike path. The first number of times I rode to the LA river path, getting there was almost the destination, the reward being a few minutes on the path before turning around and braving the ride home – and I do mean braving as I was still terrified of riding on Los Angles streets (especially those without bike lanes). Gradually, though, my distance of my trips increased, and in turn, so did the number of instances in which I opted to leave my car at home. Another revelatory

moment I experienced that year was in Martha Matsuoka's "Sustainable Development" course. On a field trip to the Los Angeles Eco-Village, resident Joe Linton guided our class around the housing complex, showcasing the various sustainable systems and projects employed by the residents to make the property more eco-friendly. The last stop on our tour of the grounds was an apartment unoccupied by residents, but filled with bicycles. It was here, Joe explained, that residents of LA Eco-Village, many of whom did not own cars, stored and repaired their bikes together. This was my first encounter with such a space, as well as a group of people who elected to not have automobiles in Los Angeles, and I remember leaving feeling a mix of bewilderment and admiration for the Eco-Village residents. Only much later would I learn that this apartment (originally just the kitchen) was the space that birthed and grew to be the esteemed Bike Kitchen, a popular Los Angeles non-profit bike cooperative that still renders the same community bike repair services.[1]

Come the following fall, upon the start of my junior year, I was eager to get back to Los Angeles and ride my bike. After spending a summer in New York City without my bicycle, I realized cycling was more than just a hobby that I enjoyed, but a welcome break from the frustration of driving my car, and a legitimate form of transportation. While enrolled in Mark Vallianatos' "Environmental Problem-Solving" course, Professor Vallianatos mentioned that a few students on campus had drafted a proposal to launch a bike-sharing program on campus, similar to the program recently instituted at the Claremont Colleges. Throughout the course of the semester he kept the class updated on the progress of the proposal, and near the

semester's end he informed the class that the administration had accepted the initial proposal, and all that remained to get the program started was working out the specifics of how the program would be run (i.e. figuring out how to cover the school in terms of liability, who would run the program and serve as mechanics and building the shop where bikes were to be repaired). I felt that I had gained a lot from the bike community, as I had recently started attending group bike rides like Critical Mass and Midnight Ridazz, in terms of mechanical knowledge of the bike, exposure to parts of the city I had never encountered and new friends, and this was my time to give back. Without giving it much thought, I volunteered myself to help launch and work as a mechanic for the infantile project. In working closely over the course of the semester with Ramon Martinez (who played an integral role while a student at Pitzer College in launching the Claremont College's bike-sharing program) and fellow student Akasham Pace, I not only learned all the ins and outs of how a bicycle works, but was also further exposed to the Los Angeles bike community and the reality of how feasible it was to live in the city without a car. Following the program's successful launch and the close of my junior year at Occidental, I made a decision that felt like it had been a long time coming – I drove my car home in May and flew back to Los Angeles, opting to live in Los Angeles for the first time since my freshman year free of a car. Upon my return, however, I no longer felt the sense of claustrophobia or entrapment that I did a few years earlier, but rather a newfound sense of freedom and lightness in traveling the city's streets on two wheels.

This, more or less, brings the story to the present day. At this point I have been living in Los Angeles for nearly eleven months without a car. I ride at least the ten mile round-trip from my house (which is on the same Los Angeles River that seemed a world away only a few years ago) to Eagle Rock almost every day, and could not be happier for it, though there have been bumps along the way. I have been hit by cars twice in the past eleven months and have been "doored" (a term in the cycling community referring to when a parallel-parked car's door suddenly opens up in front of a cyclist, effectively forcing them to run directly into the open car door) once. Almost every day I hear similar horror stories from fellow cyclists about riding in Los Angeles, and while these events do not discourage me from getting on my bike every morning, I can't help but believe that additional and more effectively implemented cycling infrastructure in a city that has relatively little, compared to other large American cities, would help alleviate these all-too-common problems. Every day I traverse boulevards and streets that serve as integral corridors for cyclists that are either entirely devoid of bike infrastructure or have infrastructure that has been implemented in a way that does very little to improve the safety of that roadway (and in a few extreme cases arguably makes it even more inhospitable to cyclists).

The U.S. cities that are leading the way in terms of accommodating cyclists on their streets are confirming, through observation and studies, that the longtime assertion from cycling advocates that increased infrastructure promotes greater ridership, which, in turn, improves safety for all bicyclists. New York, which is 305 square miles in size, has 420 miles of cycling facilities (as of 2008) that

accommodates 185,000 cyclists a day. While the city has seen the number people riding bicycles daily explode in the last few years (ridership was around 100,000 daily in 2005), safety has increased as cyclists fatalities have dropped from approximate 3,000 in 2005 to roughly 2,500 in 2008.[2] [3] [4] San Francisco, a city only 46.7 square miles in size, boasts 208 miles of bicycle facilities in the city (as of 2009).[5] While the City's infrastructure has expanded, so has ridership, from 5,626 daily riders in 2006 to 7,884 in 2008, though increased ridership in San Francisco has seen increased bicycle fatalites (but the percentage of ridership growth still outstrips the percentage of fatality increases).[6] [7] Proportionally, both of these cities have significantly more bicycle facilities than Los Angeles, which has 378 miles of bicycle infrastructure serving the City's 498.3 square miles. While the City of Los Angeles has yet to do an official bike count, the Los Angeles County Bike Coalition's count from September of 2009 suggests that at least 20,000 people cycle daily in the city, a number that could be bolstered and made safer with improved bicycle facilities.[8]

Following the City Council's recent approval of the Los Angeles Bicycle Plan on March 1st, the city of suburbs and traffic has a unique opportunity to reinvent itself as a bike friendly metropolis. The new master bicycle plan, which calls for "an eventual network of 1,680 miles of interconnected bikeways, including more than 200 miles of new bicycle routes every five years", certainly makes clear its intention to make the most of this opportunity, but the locations and specific forms of infrastructure the city decides to employ will have a dramatic effect on the success of the plan.[9] While important lessons can be gleaned from other cities like New York

and San Francisco, who have both successfully retrofitted their cities to accommodate cyclists in the past decade, Los Angeles faces a unique set of challenges, both in terms of its physical layout and dominant car culture, when implementing the newly approved infrastructure. My hope is that the following research can help highlight some of lessons learned by other cities that have undergone similar processes, the distinct obstacles facing Los Angeles in the process and a set of best recommendations that will make the city a safer and more enticing place for cyclists.

Background

In the last two decades, a new dialogue about cities has emerged – one that is distinctly different from previous discourse concerning urban centers. In the

history of the United States, a growing city, both in terms of its population and physicality (upwards and outwards) has been considered a healthy, economically prosperous. The nation's obsession with a growth economy and continued expansion was almost unanimously considered a positive trait by the majority of its citizens, save, perhaps, relatively brief economic scares like the recession of the early 1980's. Even before the most recent recession, as early as the 1990's, when Mercer began conducting its annual Quality of Life Survey (in 1994 to be exact), a new voice emerged in the discussion of the future of American cities. For the first time in the nation's history, a substantial group of people voiced concern that the country's urban centers may have expanded beyond their ideal limits – that continued physical expansion of these cities was degrading the quality of life rather than sign of health. From this discussion a whole new generation of intellectuals and urban planners influenced by visionary Jane Jacobs surfaced, inserting the concept of a livable city into the American consciousness.

The concept of the compact, livable city in the American mind is still predominantly just that – an ideal or model for which progressives and liberal urban planners advocate. In many ways, though, America once understood (whether consciously or not) the underlying components that make a city livable. Not too far back in American history, however, the arrangement of the U.S.' urban centers resembled more closely the type of city that luminaries like Jane Jacobs promoted. In many 18th and 19th century American cities, cities were composed in a way that allowed for average citizens to access shopping, entertainment and each other without the use of automobile (or any form of transportation aside from foot

for that matter). Undoubtedly these cities of yore came with their own set of unique challenges, especially before modern amenities that are now often taken for granted, specifically sanitation infrastructure like sewers, but they offered a number of benefits to the city's laborers, artisans and entrepreneurs. The more physically compact and, in turn, cohesive neighborhoods afforded their citizens interpersonal relationships, affording these residents social capital as well as interconnected economic arrangements.[10] Though a personal, privatist arrangement like that of 18th century Philadelphia depended in part on the small scale of the city, it served as a model for future urban planners as an ideal after which individual neighborhoods of a greater metropolis could resemble – a unit of relative self-sufficiency and interdependence in the midst of a great American city.

The precipitous increase in population that American cities experienced in the late 19th and early 20th centuries and the emergent predominance of industrial and wage labor jobs (compared to the prevalence of artisan-apprentice employment in previous generations) necessarily degraded the arrangements that afforded a city's residents social capital and local economic vitality. As artisans and apprentices began to disappear from the fabric of American cities, so too did their living arrangements. Under the artisan-apprentice economic model, the more financially secure master would house (in addition to providing food and a modest amount of cash) their trainee, and in many instances their families, in exchange for their work. As wage labor emerged as the preeminent economic form, however, members of the working class found themselves no longer being offered room and board by their employers, necessitating for the first time in American history a

significant demand for working class housing.[11] It is also important to note that many of the new laborers in America's urban centers, and significant contributors to the rapid population boom of the period, were immigrants fleeing unfavorable conditions abroad; whether they be famine, persecution or otherwise. In order to house the new wave of working class, and largely immigrant, people, many of the country's first large scale apartment and tenement buildings were constructed.

Tenement housing was a novel concept when it emerged in the late 19th century and posed a number of problems to the entrepreneurs who decided to construct or manage them. The first tenements were often single-family homes in which new walls were erected in order to place multiple families in a structure that was originally designed to house just one family. This posed a challenge for landlords, as these new micro-units were not equipped with their own facilities such as kitchens or bathrooms – forcing them to retrofit the structures to accommodate the additional residents. In many instances, however, residents were not so lucky as to have these amenities added, often meaning that whole floors (or entire buildings) had to share the resources designed for a single family. Additionally, as tenancy on such a large scale was a new phenomenon, no uniform standard of rent collection existed, making it difficult for landlords to gather rent in a regular and timely manner. The financial burdens landlords experienced due to adding new infrastructure to buildings and the difficulty of collecting rent prompted many to become negligent landlords, ushering in the emergence of gross living conditions as depicted by muckrakers like Jacob Riis. This model of urban tenancy persisted through the first half of the 20th century.

Following the onset of the Great Depression, when many of the country's citizens who could previously afford a home lost their house due to foreclosure, the federal government undertook serious efforts to encourage and protect home ownership in the United States. While some of the legislation they implemented was aimed at improving the conditions of low-income housing, the bulk of New Deal housing policy placed an emphasis on the importance of home ownership – specifically the single-family home. The National Housing Act of 1934, in particular, was a piece of New Deal legislation employed in order to forestall foreclosures of homes, while simultaneously making mortgages and overall housing costs more affordable for the average American. The effects of the aforementioned policies, in conjunction with recovering American incomes, subsidized highways made possible by taxpayer dollars (often connecting urban centers to suburban locales), the redlining of many inner-city neighborhoods and a number of other factors that contributed to the rapid suburbanization of America.

This process of suburbanization, which gained incredible momentum over the course of one or two decades, was aided further in coming decades by cheap oil, allowing families to live in tranquil suburbs while still commuting to city centers for work, and eventually by the seemingly limitless financial success of the 1960's and 1970's. As more Americans chose to live in the suburbs, so too did their necessities and places of work. The arrival of grocery and department stores in the suburbs (later to be replaced by one-stop shopping big box stores featuring the wares previously sold by grocery and retail outlets), followed by corporations and their accompanying jobs, left many American city centers devoid of life save those who

could still not afford to live in a suburban home. The original allure of suburban life, for many Americans, was the promise of ample space for all: a home complete with back yard and a car in the garage. As suburbs increasingly became their own satellite cities with booming populations, transportation infrastructure on a grossly large, inhuman scale was implemented in order to accommodate the tremendous number of commuters (primarily in cars) traveling in and out of their borders each day. It is this enormity of scale of suburban infrastructure, more than the distance between destinations, which allows automobiles to travel unchecked and at great speeds, making roads inhospitable to other forms of transportation.

The circumstances under which unbridled suburbanization has been able to flourish for the better part of the last century, however, are rapidly disappearing in America. The United States recently witnessed a wave of home foreclosures on a magnitude not seen since the Great Depression, immense losses of personal wealth and "the birth of a new *former middle class*". America's current economic and political landscape bears a frightening resemblance to the scenario James Howard Kunstler predicted in 2003:

> I believe this large group [of agitated, formerly middle class Americans] will attempt desperately to preserve their entitlements by electing extremist politicians who will promise to restore the perquisites of suburbia by any means necessary. Since this will not be possible in the face of implacable world conditions and trends, this kind of politics is apt to lead to scapegoating, xenophobia, and probably violence, including war.[12]

Though perhaps not quite as apocalyptically as Kunstler described, the United States' current economic and political situation, in conjunction with an end of the cheap-oil era (the average price of gasoline in the US as of March 28, 2011 is $3.59 per gallon and in the State of California $4.00) is clearly already affecting America. With the continued rise of oil prices imminent in a post peak-oil era, many urban planners and city officials are beginning to pay attention to the arguments put forth for a return to livable cities. Though likely motivated more by recent economic developments, the automobile is proving to be less prudent in the United States largest cities, both because of the cost of their operation and infrastructure. These recent developments present America's cities with a unique opportunity, one in which they can decrease their dependence on the automobile and reinvent themselves as more livable places. Fortunately, one means by which to address both of these concerns is presenting itself in the emerging bicycle movement.

For nearly a century, federal policy has been aiding the sprawl of the country's urban centers. Since the recent economic crisis has made many components of suburban life less comfortable, particularly in terms of the financial resources required to support such a lifestyle, many Americans have re-examined where their money goes. As oil prices continue to climb, it is clear that daily commutes, along with being long and congested, are a major financial drain on Americans. Prior to 9/11 and the more recent financial crisis, commutes ballooned, "Between 1990 and 2001, the number of miles we [Americans] drove grew more than twice as fast as the population."[13] Now pennies are being pinched, people are rethinking where they live and how they commute. As a result, bike counts in many

American cities in the last decade have showed increased ridership, with cyclists taking to streets that were once dominated almost exclusively by cars.[4 6] As such, "bicycling, once largely seen as a simple pleasure from childhood, has become a political act."[13] Though the increase of cyclists on city streets has certainly brought tensions with it, often because motorists have never had to learn how to share the road, the trend has prompted many cities to examine their street use and either create new bike-specific infrastructure or retrofit existing automobile infrastructure to better accommodate this new generation of cyclists.

Infrastructural Responses to the Cycling Revolution

In an effort to deal with the steady increase of urban cyclists over the past few decades, most major cities across the United States have developed various methods to better serve their residents who choose to commute by bicycle. Many of these strategies implemented by local and city governments focus on improving the safety of cyclists as a means to encourage cycling among their residents, for recreation, exercise and to help improve traffic in congested urban centers. The most commonly employed technique that cities use to serve their biking population is to develop a formal bike plan. New York City lead the charge in this movement when the Department of City Planning released "A Greenway Plan for New York City" in 1993, with Los Angeles following suit in 1996 with the Los Angeles Bicycle Plan – it is important to note that both cities previously had bicycle plans, but were relatively limited and ineffective compared to those passed in the 90's.[14] Both publications outlined the means by which the cities planned to make their streets more hospitable to cyclists – primarily by addressing the increasing tensions between motorists and cyclists.

A major component of both New York City and Los Angeles' bike plan was a pledge to construct, in the future, a certain amount of bike lanes, both right-of-way

(traveling alongside traffic) lanes and cycle tracks (physically separated bike lanes), as at the time, these strategies were accepted almost universally as the answer to troublesome interactions between bikes and cars. Additionally, both cities (and many others across the country) instituted other forms of cycling infrastructure such as signed bike routes, bike paths, or greenways, and more recently, bike boulevards and shared lane markings (sharrows) as a means to increase the safety and popularity of urban cycling, and help address the traffic congestion problems experienced in the urban core. While the proliferation of urban cycling infrastructure has certainly helped raised the profile and awareness of cycling as a viable form of alternative transportation, the impact, in terms of safety, of each form of infrastructure is a point of contention within the bike community. The following section aims to highlight the strengths and weaknesses of the various types of infrastructure, indicating under which circumstances each can be most effective, in order to inform future bike facility implementation in Los Angeles.

Bike Lanes:

In the last twenty years, bike lanes have emerged as the most predominant and visible form of cycling infrastructure across American cities. A bicycle lane is demarcated by two stripes of paint, separating the lane from other traffic lanes; often in between a lane designated for parallel parking and the roadway's other traffic lanes. (See Figure 1) Infrastructure of this variety is best suited for major arterial roadways, on which traffic often moves significantly faster than the speed of a bicycle, making it particularly unsafe or uncomfortable for a cyclist to be a part of

the regular flow of traffic. In Los Angeles, bike lanes are the most abundant form of cycling infrastructure (accounting for 186 of the city's 378 miles of bike facilities) and are prominent on portions of thoroughfares such as Sunset Boulevard, Venice Boulevard, Santa Monica Boulevard and Eagle Rock Boulevard, though none of these roadways feature an unbroken bike lane for the entire length of the boulevard.[15] (Figure 2) The current, segmented state of these bikes lanes on many of the City's major thoroughfares makes them less desirable bike routes as many of a bike lane's safety benefits are compromised when it disappears and reappears every couple of miles. Bike lanes have become the preferred form of cycling infrastructure for many cities for a variety of reasons, ranging from their safety benefits to the relative ease with which they are implemented (in comparison to a bike boulevard, which requires not only one road to be redesigned, but also the whole surrounding area to address the way traffic will be affected on adjacent thoroughfares).

First and foremost, however, bike lanes are touted as creating a safer environment for urban bikers. They are presumed to create a safer environment for the cyclist by removing them from the normal flow of traffic, decreasing the likelihood of collisions between car and cyclists. Bike lanes also give cyclists an alternative to occupying the middle of the right lane while riding. This practice of riding in center of the right lane of traffic is called "taking the lane, a custom that is central to the rider-motorist discord."[1] This habit on the part of cyclists is for their own protection, so as to remain visible to the motorist who may not notice them if they straddle the white line on the road's edge and steer clear of the potholes, debris, sewer grates and other hazards regularly encountered on the side of the

road. Though employed for safety by the cyclist, taking the lane enrages many motorists who either think they are entitled to the entirety of the road or feel that the biker is unfairly slowing their progress.

Another safety concern that bike lanes are supposed to address is accidents that occur from cars swerving into the left lane while overtaking cyclists. Often, when bikers are riding along the side of the road or in the right lane, cars passing them will move partially into the left lane, so as to give the cyclist more space when they pass. However, this practice sometimes results in collisions with cars moving in a parallel direction if the driver does not carefully examine the availability of the left traffic lane before passing. This problem is exacerbated when drivers closing in on bikers neglect to see the cyclist until the last moment before passing, often causing them to quickly swerve into the left lane to avoid hitting the cyclist and into another vehicle. Finally, the age old practice of cyclists not adhering to the rules of the road (i.e. not stopping at stop signs / red lights, failing to signal when turning etc.) infuriates drivers, as they believe that if they share the road with cyclists, they should have to share the rules of the road as well.

While bike lanes do offer a good solution to some of these problems, many of them are not addressed as easily as the installation of a bike-only lane. Bike lanes serve as a great alternative to riding on the street's edge, and therefore are good at preventing rear-end collisions, in which a cyclist is hit behind from a car. Though these types of accidents are rare when compared to other types of car-bike collisions (the most common type of crash between cars and bikes occur when a car

is making a turn), they often happen at the highest rates of speed, and, in turn, are the most fatal of all classifications of collisions. Bike lanes also ease the pressure on motorists attempting to overtake a bicycle on the road – many bike lanes provide sufficient space for the cyclist to ride in a way that a passing motorist does not have to alter lane position to pass them, thus eliminating many of the collisions from cars drifting into the left lane. Additionally, and most importantly, the presence of a bike lane on an urban street serves as a continual reminder, both to cars and prospective cyclists, that the bicycle is a legitimate form of transportation that deserves its own space on the road. This is especially so when the bike lane is painted a different color from the rest of the roadway (often green), which is common in many cities like Portland and New York. (Figure 3) For the new or prospective rider, bike lanes undoubtedly serve as a catalyst for getting on the road, as a space of sanctuary on an otherwise daunting, congested road.

The proliferation of bike lanes throughout most major American cities in the past two decades has not come without its own set of challenges and safety concerns, however, as they present a number of problems for cyclists that are often not readily identifiable upon first glance (or first ride, for that matter). One major problem with bike lanes is the false sense of security it provides for the cyclist, especially those new to the road and not comfortable interacting with cars. The solid white stripe used by the Department of Transportation to delineate bike lanes can feel like a protective barrier to many cyclists, guaranteeing that no cars will cross over a solid line on the road and into their path. In reality, however, one knows that neither cars nor cyclists always obey the rules of the road, and even

when they do not deliberately seek to break the law, it is common for cars and cyclists alike to drift into each other's path. Therefore, it is important that these lanes do not cause either party to think that the lanes will prevent them from having to interact with, and remain vigilant of one another.

Another unique challenge posed by bike lanes, which happens to be the opposite of the previously discussed false sense of security, is the phenomenon of the cyclist feeling boxed in to the bike lane. Though bike lanes are regularly clear and free pathways, they are not always free of roadblocks or hazards. When a cyclist becomes accustomed to, or learns to ride in, bike lanes, they can lack the knowledge and/or skills to navigate the street when the bike lane is obstructed. This fear of integrating with traffic can be severely heightened by adjacent motorists, who often resent cyclists in their company when there is a bike lane present (whether obstructed or not). In cases like this, "Some motorists become vigilantes, harassing any cyclist 'not in his place'."[16] In short, the mere presence of a bike lane can lead to an unconscious rejection of California Vehicle Code 21200 (which states that bicyclists have all the rights and responsibilities of vehicle drivers) from motorists, causing them to believe that cyclists should not leave the bike lane under any circumstances.[17] It is not only safer, but also necessary in many instances, for cyclists to leave the bike lane, especially when making a left turn, so this tendency for drivers to think that bicycles should stay confined to the bike lane can be very troublesome for the cyclist.

The belief of motorists that cyclists belong in the bike lane and should not leave its boundaries is especially troubling for the bicycle rider who needs to make a turn. When making a left hand turn on a city street, cyclists generally have to cross at least one full lane of traffic (often two if there is a left hand turn lane) in order to get into proper position to make the turn. Motorists who have become accustomed to cyclists riding to their right in the bike lane will regularly not provide enough room for the bike rider to merge into, and across, their lane of traffic in time while approaching an intersection, either effectively pinning the cyclist to the bike lane or forcing them to dart across lanes of traffic to make their turn. Though on the surface this may seem like a minor inconvenience for cyclists, most car-bike collisions occur when one (or both) parties involved attempt to turn, making left turns a serious cause for concern.

Though left turns are undoubtedly perilous for cyclists, and to a lesser extent cars, often times riding straight through an intersection can be most dangerous for cyclists, especially when a car tries to turn right at an intersection. As bike lanes are predominantly positioned to the right of vehicle lanes, cyclists attempting to overtake, or ride along with automobiles are generally forced into the car's blind spot. The consequences of this situation are severe when motorists need to take a right hand turn and cannot see the cyclist alongside them; "'right-hook' collisions, as riders call them, are among the most common risks of urban cycling."[18] [19] Right-hook collisions are especially common when roads lack a right turn lane, where motorists are generally only concerned with making sure oncoming traffic is not coming from the left before making a right turn. In a case like this, the bicyclist can

be riding perfectly legally, proceeding straight into an intersection where they have the green light, only to be broadsided by their neighboring motorist who has crossed the bike lane either without looking or unable to see the biker alongside them. The presence of a right hand turn lane is not a lone solution to this problem, however, as the design of the bike lane plays an important role creating safer intersections.

At intersections with both right turn lanes and bike lanes, there are two different ways the bike lane can be positioned. Either the bike lane stays at the right-most side of the road, shifting to the right as the right hand turn lane opens on the side of the road, or the right hand turn lane emerges from the right side of the bike lane, effectively placing the bike lane in between the right hand turn lane and the right lane of traffic moving straight through the intersection. (Figure 4) The former model, where the bike lane stays to the right-most side of the road is one of the most dangerous scenarios urban cyclists regularly encounter – so much so that this type of road design has been dubbed "coffin corner". (Figure 5) Not only is this design dangerous for the obvious reason that it instructs cyclists to stay to the right of traffic that clearly intends to turn into them, placing all the burden of maintaining safety on the driver, but it also encourages motorists to disobey traffic laws. Traffic laws state that a motorists' approach for right turn, and turn itself, should be made as close as practical to the right-hand curb or edge of the roadway.[16] Therefore, when a bike lane is placed to the right of a right turn lane, cyclists are not only put in danger, but cars do not approach the turn as close to the right curb as possible, so as

not to enter the bike lane. This problematic design forces cyclists and motorists that wish to behave safely to ignore the street's markings.

The final, major design flaw of most urban bike lanes is their proximity to the parallel-parked cars along which most bike lanes run. When Los Angeles Magazine writer Matthew Segal spoke with Los Angeles bike advocates Stephen and Enci Box about the bike lane running along Sunset Boulevard at Sunset Junction, he expected Stephen to make a remark about how encouraging it is to see a bike lane on such a prominent thoroughfare in the city:

> "Actually, we don't like this bike lane," he [Stephen] says, blinking from underneath his owlish eyebrows. It runs too close to the parked cars, Box says, "so every door is going to significantly take the bike lane, which means you're constantly being threatened with either hitting a door or having to dart into traffic on the uphill."[1]

This complaint has become so common that it seems to be developing into a mantra for urban cyclists. As bicycle advocates have put pressure on local government to acknowledge their presence on the roadways and plan for them moving forward, the most common result has been the addition of bike lanes. While this does acknowledge the presence of cyclists on city streets, it is often done without actually planning for cyclists and their needs.

Many cities, including Los Angeles, have boasted their ability to put bike lanes in, traveling both directions, on standard, 44-foot wide roads, without compromising the parallel parking on either side of the street. In this model, cities

allocate an approximately 7 foot wide space for parallel parking, a bike lane 5 feet wide (from the outside of the stripe on one side of the lane to the outside of the painted stripe on the other side) and a 10 foot width for moving cars, with a mirror image on the other side of the road.[16] (Figure 6) As the average car is approximately 6 feet wide (8.5 feet is the average width for commercial vehicles), this leaves, at maximum, one-foot clearance between the parked car and the right-most edge of the bike lane. With these dimensions, even a small sedan's open doors would occupy a majority of the bike lane, forcing an oncoming cyclist to hug the left stripe of the bike lane at best. However, it is clear that in reality, drivers do not always park as close to the curb as physically possible, meaning roads of this design allow for average vehicles to block the entirety of the bike lane when their doors are open.

One very good example of this type of imprudently implemented bike lane is the recently constructed (or rather, simply plopped down) York Boulevard bike lane, which runs from through the Highland Park neighborhood of Northeast Los Angeles, from Eagle Rock Boulevard to Avenue 55. York Boulevard is a standard 44-foot wide road, with three lanes of traffic (two for each direction of traffic and a center left-turn lane) and parallel parking on both sides of the street.[20] Instead of altering the roadway design when the artery was designated to receive a bike lane, the width of the parallel parking and outer traffic lanes were reduced (the center turning lane was left unchanged) and with the few excess feet, a bike lane was painted. The lack of planning and design makes this bike lane remarkably unsafe for two reasons, the first is that the majority of the bike lane is in the door zone, and secondly, the quality of the roadway.

For the construction of the York Boulevard bike lane, the width of the parallel parking lane was reduced, meaning many automobiles now park on or up against the line delineating the parking lane from the bike lane, leaving cyclists at the mercy of people entering and exiting their cars. This problem is exacerbated by the fact that the bicycle lane is not even the full 7-foot width it could be, but rather, the 5-foot minimum stipulated by the Los Angeles Department of Transportation (LADOT).[21] LADOT's argument for the narrow bike lane was to ensure that motorists would not confuse it for another lane of traffic, though painting the lane another color could have solved this potential problem (a common feature of bike lanes in other cities). Additionally, the pavement in the bike lane on both sides of the road has the worst condition of any in the breadth of the roadway. York Boulevard does not have particularly good pavement condition as it is, yet the bike lane has more cracks and potholes than any of the traffic lanes, forcing cyclists to choose between braving inhospitable terrain and entering the lanes of traffic.

Bike lanes of this nature are popping up all over urban centers as city officials try to balance the demands of cyclists and crunched budgets. However, it is important, as city officials and roadway engineers move forward promoting and constructing bike lanes, to keep in mind what is of paramount importance – the safety of all on the road. To build bike lanes that, on the surface, encourage cycling, but do not promote safety for all of the roads' occupants, is not only a waste of money, but malpractice on behalf of planners and engineers. As people continue to turn to bicycling as a means of transportation, recreation and exercise, it is

important that cities take the necessary precautions to ensure that people can cycle without endangering one another.

Separated Bike Lanes / Cycleways:

When city officials and planners started understanding the concerns voiced about the potential safety hazards of bike lanes, a commonly accepted solution was to remove cyclists from the door zone of parallel-parked automobiles by physically separating the bike lane from the rest of the roadway. (Figure 7) Often this is achieved by placing the bike lane in between a lane designated for parallel parking and the sidewalk. Additionally, in order to avoid moving cyclists from one door zone (on the left side of the car) to another (on the right side), these physically separated bike lanes, also referred to as cycleways, were given a buffer zone from the lane of parallel parking (often 2-6 feet from the edge of the parallel parking lane to the stripe delineating the separated bike lane) – effectively creating a designated bike free space into which car doors can open. Many cycleways are further removed from automobile and pedestrian traffic by being placed at a height distinct from both the roadway and sidewalk, serving as a further reminder that it is a space exclusively for use by cyclists. Though featured in New York City, Portland, Seattle and nearby Long Beach, to name a few cities, Los Angeles does not have a single separated bike lane. As with the on-road bike path, however, the physically separated bike path comes with its own set of advantages and disadvantages.

An immediate and visible advantage of the separated bike lane is its apparent safety. Though there are certainly safety concerns, which will be covered shortly,

the cycleway is a visually appealing thoroughfare, especially for young or inexperienced riders who may not be comfortable riding in such close proximity to the flow of traffic. Undoubtedly increased ridership is one of the primary goals of urban cycling infrastructure, and in terms of achieving that, the cycleway is one of the most effective, especially in terms of enticing new cyclists to the streets. Undoubtedly a separated bike path is preferable to a street with no bicycle infrastructure, though some question whether the cycleway positively affects the safety of automobiles more than cyclists.

The separated bike path is remarkably effective in eliminating the problem of cars colliding with cyclists from behind, as the barrier of parallel-parked cars protects them from such an occurrence. Similarly, when riding along a cycleway, bikers really are safe from cars drifting into the bike lane, a common concern for bikers riding in a typical bike lane. Furthermore, the separated bike path is remarkably effective in terms of improving safety for automobiles. As many drivers are wary of sharing the road with bicycles, they tend to drive more dramatically, making nervous or over exaggerated movements to give the cyclist space. While affording a bike space is important for the cyclists' safety and a courteous maneuver on the part of a motorist, aforementioned problems, such as drifting into the left lane of traffic before ensuring the lane is clear, can arise from this sort of behavior.

Additionally, a separated bike path prevents cyclists from having to diagonally cross lanes of traffic in order to prepare for a left turn. This maneuver can be dangerous for a cyclist, who, attempting to make a left hand turn from a bike

lane, must indicate to traffic their intention to enter the roadway and progress to the left-most lane. While this can be hazardous to the cyclist, studies demonstrate that it is still not nearly as threatening of a situation as when the biker enters an intersection (as intersections are the most dangerous scenarious for cyclists), suggesting that more than anything else, this type of maneuver from the cyclist is troublesome because of how it can enrage motorists who may be slowed down when they must yield to the bicycle crossing to the left-most lane.[19] This sort of scenario is an example of one more way in which the separated bike lane facilities may actually be more conducive to automobiles than to cyclists.

Much like a regular bike lane, however, the cycleway poses a threat of the cyclist feeling boxed-in to the space should they approach an oncoming obstacle, such as an illegally parked car or trash cans, blocking the separated path. This sort of concern is alleviated by properly designed buffer zones, which can serve as an emergency lane in the event of an obstruction in the cycleway. If the buffer zone is not properly constructed, or if, as it is in many cases, the separated bike lane is placed at a different height from the buffer zone or sidewalk, no emergency lane may be available in the event of an obstruction of the cycleway. This reemphasizes the importance of public education (reminding the populace that these routes are exclusively for use by bikes), as well as effective repercussions for violating the space (specifically in the case of illegally parked cars).

The most serious safety hazard that separated bicycle lanes present cyclists, however, is apparent at intersections. Though right-hook collisions are a serious

concern for cyclists riding in a standard bike lane, at least riding alongside traffic allows the cyclist to foresee a situation in which they are at risk of a right-hook collision as they approach an intersection, affording them the opportunity to move out of the bike lane and into the normal flow of traffic. By placing themselves directly behind and in front of cars, a cyclist is able to avoid the most common type of car-bike accident. A cycleway, on the other hand, especially when separated by a lane of parallel parking, obstructs the view of motorists from bikes on the separated bike path (and vice versa) as both parties approach an intersection. For this reason, when an automobile at an intersection on a street running parallel to a cycleway wishes to make a right hand turn, the results can be very dangerous. In order to proceed safely through a right turn in this scenario, the car driver must stop first at the intersection, and then yield again immediately after making the right hand turn before proceeding forward in order to ensure that no traffic is approaching from either direction on the separated bike path. (Figure 8) Smarter roadway design keeps both parties involved in sight of one another at all times, reducing the number of times bikes and cars alike have to stop to ensure they have a clear path ahead of them.

Aside from the serious safety concern regarding collisions between motorists and cyclists at cycleway intersections, arguably the largest drawback of the separated bike lane is the message it sends to automobiles and cyclists alike. By physically removing cyclists and their movements from the proximity (and often times the view of) traffic, it reinforces the all too popular notion for motorists that cyclists do not belong on the road with the rest of traffic – directly undermining any

sense of parity between bicycles and automobiles on a city's streets. The message that has been pushed on cyclists since the appearance of physically separated bikeways started appearing is that they are 'for your safety', indicating to cyclists that they are not safe with traffic. This is especially damaging to inexperienced riders, as it plants the idea in their head that riding outside of the separated lane is dangerous. Since no transportation budget will allow for a fully comprehensive system of separated cycling facilities (even though their safety benefits are a point of contention among cycling advocates anyway), it is important to teach motorists and cyclists how to interact with each other – education of this manner imparts the most important lesson and will ultimately provide safer city streets than the physically separated bike facilities.[22] [23] Though certainly offering some legitimate safety benefits and enticing for unconfident cyclists, the separated bike lane does not achieve the important overarching goal of cycling advocates, which is for cars and bikes to understand that the roadway is a shared space, and that they must learn how to interact with each other in a way that reflects this truth.

Bike Routes / Shared Roadways:

Bike routes and shared roadways are another popular form of cycling infrastructure, and are designated by signs demarcating the roadway as a shared space or shared roadway markers physically painted on the street (often referred to as "sharrows" for their shape). Because bike routes require that automobiles and cyclists share the same space, they are best suited to roadways with moderate speed limits and amounts of traffic. Bike routes are a prevalent form of bike facility

because they require little to no restructuring of the roadway, and as such, are remarkably cheap in comparison to other cycling infrastructure. Bike paths, which will be discussed later, can cost anywhere between $500,000 and $2,640,000 to construct per mile (depending on where they are implemented), whereas bike lanes cost between $28,000 and $50,000 to construct per mile and bike routes a mere $20,000 per mile.[15] Considering these numbers, it is understandable why bike routes are such a popular option for cities looking to implement cycling facilities. In Los Angeles, they make up a significant portion of the existing bike network, accounting for 124 of the 378 miles of facilities. As with every type of bike facility, however, bike routes have their strengths and weaknesses.

Though not appropriate for high speed, high traffic thoroughfares, bike routes, especially those with sharrows, are a particularly good facility in terms of the message they send to motorists and cyclists alike. Sharrows, a painted symbol of a bicycle followed by two direction arrows on the roadway, are an important educational tool for urban bicycling. When properly placed, a sharrow occupies the center (or near center) of a traffic lane – the idea being that cyclists are supposed to ride through the center of the sharrow (often a small strip in the center of the pictogram is left unpainted so bikes can ride through without riding over the ridges of the raised paint). (Figure 9) The purpose of the sharrow is two-fold; its large size is an unavoidable reminder for automobiles that bikes belong on the roadway, and its position on the road instructs cyclists and motorists as to the correct lane position for bikers.

Though an effective teaching tool when featuring sharrows, a major drawback of bike routes is that many are simply marked by road signs, making the street essential devoid of any sort of bike facility. Street signs that indicate a bicycle route are often scarcely placed along such routes, and are too easily ignored or unseen by motorists traveling along the roadway. The consequence of this is often that cyclists riding along bike routes are subjected to the same conditions they would be on any other city street, forced to occupy the center of a lane for safety, giving motorists the impression that the cyclist is infringing upon their space. In reality, a bike route merely marked by road signs is no friendlier to bicycle traffic than any other city street.

Another significant concern with bike routes, even ones demarcated by sharrows, is that, because of their relatively inexpensive capital cost to implement, they are often used as a stopgap measure on high speed, high traffic roadways on which a bike lane would be much better suited. Bike routes constitute a large portion of the current cycling facilities network in Los Angeles, often on major arterials that have been designated to receive bike lanes, but currently do not feature one. Busy roadways like Wilshire Boulevard from Westlake to Miracle Mile, Fountain Avenue in East Hollywood and Colorado Boulevard from Eagle Rock to Glendale are all currently bike routes that are treacherous for cyclists to ride due to the remarkably high speed at which motorists travel along these corridors. Furthermore, only one of these arteries, Fountain Avenue, has sharrows, leaving riders to fend entirely for themselves on the other two thoroughfares.

While the underlying message bike routes with sharrows instill to cyclists and motorists alike is the better than those reinforced by bike lanes or cycletracks, they are clearly unsafe in certain circumstances. In the future, bike routes should be implemented only on low speed, low traffic volume thoroughfares in which bicycles and automobiles can travel at roughly equivalent speeds. These circumstances allow the two forms of transportation to learn how to interact with each other and help promote parity between the bike and car. Though not ideal, bike routes with sharrows should also be used when a gap exists between two sections of a roadway with a bike lane – only as a stopgap until the two sections of the bike lane can be connected.

Bike Boulevards:

The discussion of urban cycling facilities has historically focused on three forms of infrastructure; bike lanes, bike routes or shared roadways and bike paths (to be discussed shortly). In recent years, however, a number of cities, including Portland, Minneapolis, Albuquerque and Berkeley, have expanded upon the idea of a shared roadway by creating bicycle boulevards. The bicycle boulevard is similar in structure to shared roadways with sharrows, albeit with a few additional measures taken to ensure that the roadway caters to cyclists and discourages through automobile traffic. Essentially, "bike boulevards are low-volume and low-speed streets that have been optimized for bicycle travel through treatments such as traffic calming and traffic reduction, signage and pavement markings, and

intersection crossing treatments."[24] This design does not prevent cars from using the space, but discourages the route's use as a thoroughfare, creating a safe, shared roadway for cars and bicycles. (Figure 10)

Bicycle boulevards are a particularly appealing option as a bike facility in particular circumstances, because they offer a number of benefits aside from creating a more attractive cycling thoroughfare. They can help restore calm to a neighborhood street that sees more traffic and higher speeds than was planned for the road. In Berkeley, their first prominent bike boulevard was only implemented after other traffic calming measures had been taken to counter the high volume of cars using neighborhood streets to access the nearby university. Traffic diverters were installed in order to stem the heavy use of neighborhood streets to access the University of California, Berkeley, and it wasn't until after they were in place that the cycling community lobbied to create the bicycle boulevard, since most of the requisite features for such a facility were already in place.[25] In this case, a bike boulevard was especially attractive (and preferable to a bike lane, for example) due to the low cost of adding one, as most of the necessary infrastructure was already in place.

Bicycle boulevards offer other incentives, both financial and otherwise, to neighborhoods in which they are created as well. The slower speeds and reduced volume of traffic characteristic of bike boulevards is attractive to other forms of non-motorized transportation or recreation too. Because their design promotes running, walking and rollerblading, just to name a few activities, they often become

hubs for outdoor activity and physical fitness – Minneapolis actually refers to their bike boulevards as "Bike/Walk Streets".[24] Bike boulevards can be more attractive places for families to live, being relatively quiet and affording safer environments in which children can play. This same preference for safer and quieter streets suggests that bicycle boulevards also increase the value of homes on the boulevard and adjacent streets.[26]

As with each form of bike facility, there are a number of considerations to be made when considering implementing a bike boulevard. The following is a summary of conditions under which a bike boulevard is well suited to address bike infrastructure needs in a neighborhood. First, bike boulevards are best suited for streets in a gridded system, typical of urban centers, as this design allows traffic that is being discouraged from using the boulevard to simply utilize parallel-running arteries for through traffic. (Figure 11) The tendency of suburban streets to have more curved roadways and dead ends makes them less attractive candidates for bike boulevards, as the road design leaves automobiles with fewer suitable substitute arteries for the street claimed by the new boulevard. (Figure 12) Bike boulevards are also made more effective when they serve as connectors, either between two thoroughfares of a city's bike network or when they lead riders to popular destinations, such as mass transit hubs, educational institutions, shopping or entertainment. Finally, as alluded to earlier, bike boulevards are best created on roadways that already share the requisite characteristics of a bike boulevard – either featuring traffic calming devices or low traffic volume – as adding a bike

boulevard to this setting will require less capital investment and will be a less dramatic adjustment for area drivers.

Los Angeles currently has no bike boulevards, although there is a proposed site for the city's first. The stretch of 4th Street between Hoover Street and Cochran Avenue, which reaches from Westlake to Hancock Park, is already a popular bike route, adorned with signs demarcating it as such and sharrows marking the roadway. 4th Street is an ideal candidate for becoming a bike boulevard as it is one of the most low-volume east-west thoroughfares in that section of Los Angeles, offering attractive alternatives such as 3rd Street, 6th Street or Wilshire Boulevard to potentially diverted traffic. The section proposed by LACBC and Cyclists Inciting Change through Live Exchange (CICLE) to become a bike boulevard is currently a popular bike route, though scarred with potholes and lengthwise tears in the pavement just large enough to engulf a bike wheel, and has popular support from many community members and City Council member Tom Labonge (who's district encompasses the proposed section of 4th street).[27] Realistically, the roadway would have to be resurfaced along certain stretches and have some of its intersections redesigned with a number of possible design elements, which will be covered later in a detailed discussion of Bicycle Friendly Streets roadway design, for it to become an attractive bike boulevard. Though the capital cost involved in resurfacing the road may be high, the roadway would last significantly longer were it turned into a bike boulevard, as bike's wear on pavement is a fraction of that caused by an automobile. This stretch of roadway is a highly attractive location for Los Angeles'

first bike boulevard, since aside from a few infrastructural adjustments, it already features many of the characteristics of a bicycle boulevard.

One major critique levied at bike boulevards as an emerging bike facility is that they remove cyclists from the major arterial roads of cities, making bicycling a less visible form of transportation, and consequently more marginalized in the minds of other commuters. Furthermore, some assert that it advocates for a hidden bicycle network, creating a mindset among urban planners and officials that bikes should be kept from the proximity and view of automobiles in the city's layout. However, as previously mentioned, for bike boulevards to be successful (in terms of the number of riders they attract) they must connect existing segments of the bike network, many of which are likely bike lanes or another visible form of cycling facility. Additionally, bike boulevards provide a relatively safe environment in which young or new cyclists that might otherwise lack the confidence to ride on a typical shared roadway or bike lane along a major thoroughfare to practice riding with traffic. Learning how to share the road with automobiles in a low-speed, low-volume setting may give them the confidence to ride on more congested thoroughfares, ultimately increasing the visibility of the bicycle as a legitimate form of transportation.

Bike Paths:

Bike paths constitute the final significant form of cycling infrastructure that make up urban cycling networks. Though a critical part of many cities' networks, they have not been discussed at length until this point, because in many ways, they are inherently less urban than the other types of facilities. Bike paths are roadways that are dedicated specifically for use by non-motorized traffic. They can, in some cases, be reserved exclusively for use by cyclists, but can also be open to use by pedestrians in many instances. Though many European cities have independent urban bike paths – long segments of bike-specific roadway running through the city's center distinct in its trajectory and reach from shared roadways – American cities have generally opted to install bike lanes or separated bike lanes alongside existing mixed-use streets. In the United States, bike paths tend to be less prevalently featured in the central city, and are typically constructed near natural features, like a waterfront or park. (Figure 13)

Bike paths are a great form of bicycle facility that offer a number of advantages for cyclists. The obvious advantage of utilizing a bike path is that they tend to be entirely removed from other forms of traffic, save maybe pedestrian, making them a remarkably safe facility. Without fear of being hidden at intersections or mixed in traffic, cyclists can travel along paths rapidly, often turning them into bicycle expressway. Additionally, because they are often implemented near natural features, they afford cyclists a more natural riding environment and a respite from the noise and distractions that come along with urban cycling.

Los Angeles has a few bike paths, though they only constitute 64 miles of the city's current bike network, the most notable of which is the Los Angeles River Path.[15] The path has two distinct sections, the longer of which runs from Long Beach up the Southeast Los Angeles, and the shorter of which runs from where Interstate 5 passes over the river near Elysian Park up to Riverside Drive on the northernmost end of Griffith Park. The path is a classic multi-use path, meaning it is designated for use by both cyclists and pedestrians. Though a useful and cherished part of the Los Angeles cycling network, there are a number of the path's aspects that are a point of contention in the city's cycling community. One point of debate is who has the right of way on the path. Many cyclists believe that they should have the right of way, as many are using the path as an expressway to travel quickly without the hassle of cars, insisting that pedestrians keep to the side. On the other hand, pedestrians are correct in pointing out that the path is designated for shared use, and called the Los Angeles River Path, rather than the Los Angeles River Bike Path, and as such, they have as much a right to occupy the path as cyclists do. While both sides have legitimate concerns, the path will likely remain multi-use, where both pedestrians and cyclists alike must learn how to be courteous of each other while using the facility.

A greater concern about the path, however, is how it fits in the context of the rest of Los Angeles' bicycle network. Much like a bike boulevard, bike paths are best utilized when the serve as a thoroughfare or connector between other segments of a city's greater bicycle network, complimenting facilities like bike lanes and routes. While still useful, bike paths are made significantly less effective when they exist as

a solitary facility, requiring cyclists to travel along routes without any bicycle infrastructure. The Los Angeles River Path suffers from this problem of being a relatively isolated cycling facility, especially in the section from Interstate 5 to Griffith Park. Only a few of the streets that serve as entry points to the path along this stretch feature any sort of bike infrastructure. The most lamentable part of the current path's construction, however, is that the two main segments of the path do not link to each other, forcing cyclists to traverse downtown's city streets in order to connect to the other portion of the path. If the two sections of the path were connected, the route could serve as a regional thoroughfare – a backbone to southern California's bicycle facilities.

Though undoubtedly an important component of urban cycling networks, the sites where they have traditionally been constructed make bike paths less urban in nature than many other forms of cycling facilities. This characteristic of many bike paths underscores the importance of their connectivity to the rest of a city's bicycle network. Exactly because they tend to be located along natural features that often continue past the borders of a city, they have the unique opportunity to serve as the arteries of a regional cycling network. Proper implementation of bike paths would allow them to serve as collectors, allowing cyclists to travel from the bicycle network of one city to the next.

Looking Forward: The Los Angeles Bike Plan

Though some of the benefits and concerns of the various forms of bicycle infrastructure are self evident, many of them are less apparent until one has spent a significant amount of time utilizing each of the different types of facilities. For anyone who has ridden a bicycle extensively throughout Los Angeles, it is clear that the engineers of LADOT and the Los Angeles Department of City Planning did not fully understand the strengths and weaknesses of each form of cycling infrastructure, and the conditions to which each is best suited, before implementing them across the city. Admittedly, however, what is best suited for improving the safety of cyclists has not always been the only concern when considering adding infrastructure to a roadway, as other factors such as the capital cost of the facility and its effect on traffic play a role in the decision making process. The previous section lays out, in a comprehensive manner, the issues many bicycle advocates have been voicing individually about the various types of bicycle facilities. The hope in doing so is that, moving forward since the passage of the LA Bike Plan, future implementation of bicycle infrastructure in Los Angeles will be done with the safety of cyclists as the primary goal; and that the information provided about the characteristics of each cycling facility will be taken into consideration for future infrastructure construction.

While the 2010 LA Bike Plan is undoubtedly an ambitious, multifaceted document, it has one clearly stated overarching goal, which is to create "a bicycle transportation network that works for people of all ages and abilities, not just for the folks that are out there now who are hardcore cyclists, we want to make it appealing for a mom and her kids or a grandpa."[21] This stated goal represents a relatively recent shift in terms of priorities for Los Angeles' bicycle network, as historically the idea has been to create major bicycle corridors, allowing cyclists to travel along major arterials that access many of the city's more popular destinations. The previous emphasis placed on Los Angeles' Backbone Network (which will be discussed in more detail later) was likely inspired by the City's first major bicycle infrastructure.

Around the turn of the 20th century, prior to the mass production of the automobile, the California Cycleway, "an elevated bikeway between the historic Los Angeles Plaza and Pasadena's Hotel Green" was constructed.[28] The wooden cycleway afforded cyclists an alternative to traveling along the hilly roadways between the two cities. While the structure only remained in usable repair for a little over a decade, it imparted upon planners and cyclists the notion that the future of cycling in Los Angeles was constructing arterials that served similar functions: creating a skeletal system of unbroken thoroughfares that bikers could use to travel around the City. This idea persisted throughout the majority of the century, with the bulk of Los Angeles' 1977 Bicycle Plan being devoted to the City's Backbone Network. The importance of the Backbone Network was further supported by Los Angeles Country Metropolitan Transportation Authority (Metro) study that found

that, "despite having little to no amenities for cyclists, the regions arterial surface streets were the main routes of travel for bicyclists."[29] Though the importance of creating such a system has not been discredited – in fact, many of the roads, such as Venice Boulevard, Santa Monica Boulevard and Sepulveda Boulevard, that appear in the 1977 Backbone Network are still designated backbone streets in the current plan – the focus of the plan has shifted to enticing all sorts of cyclists to the streets rather than the commuters to whom the Backbone Networks caters.

Following the lead of other cities that have seen increased ridership in response to more comprehensive and varied cycling facilities, rather than just a network of major bicycle arterials, the new Los Angeles Bike Plan shifts focus away from the Backbone Network being the paramount goal for the future of the City's bicycle network.[4 6] Of the 1,680 miles of bicycle facilities for which the new plan approves construction, almost half (834 miles) are designated to the Neighborhood Network, with the Backbone Network comprising 707 miles of future construction.[15] While the Backbone is clearly still a priority, the shift in emphasis to strengthening the Neighborhood Network reinforces the newfound mission of creating a comprehensive bicycling system in the city – one in which cycling facilities on major arteries are connected to each other through the low-speed and low-traffic bike friendly roadways. When other cities like New York, San Francisco and Portland made similar changes in their bicycle networks, focusing on bringing all types of cyclists onto their streets, it helped change the perception of the bicycle as a form of transportation.

The public perception of Los Angeles is that it is still a city of automobiles. Previous bike plans, with such a strong emphasis on the Backbone Network, have, in many ways, reinforced this notion by catering particularly to the type of cyclist that is making trips of considerable length utilizing the City's busiest arteries. The commitment to expanding the current Neighborhood Network into a truly comprehensive system aims to change the way people think about cycling in Los Angeles. With a strong Neighborhood Network in place, families can ride for recreation, people can pedal along safer streets to shopping or entertainment destinations, and ultimately, the idea of *who* cycles in Los Angeles can be changed. While important for the prospective rider, the estimated increase of readership that will follow these structural changes to the bicycle network have equally important implications for motorists as well.

Exhaustive research has shown that increased visibility of cycling, specifically in terms of the number of cyclists on the road, has taught motorists to be better at interacting with bikers.[30] Though it seems common sense that more cyclists taking to city streets, especially new or unconfident riders, would result in a rise in bicycle-related accidents and fatalities. In fact, research on this topic overwhelmingly suggests the opposite; that more bicycles on city streets actually teaches motorists to interact with cyclists better – increased bicycle traffic slows down automobile traffic and allows drivers to understand the way cyclists behave on the road. The assertion drivers learn how to interact with bikes is supported by the fact that the majority of bicycle accidents involve automobiles, rather than bike on bike collisions. As such, the relatively declining fatality and accident rates

(relative to the increase in ridership) in cities like New York and Portland specifically suggest that motorists really can learn how to share the road with cyclists in a safer manner.[31] [32] While safety is important in its own right, and the perception of cycling safety plays an important role of further enticing cyclists to the streets, increased bicycle ridership offers additional benefits to cities as well.

In addition to the aforementioned safety benefits of increased bicycle ridership, a plethora of other, though less statistically demonstrable, common sense benefits come from such a boost in cycling. The most obvious of these gains is community health; more cycling activity results in improved physical fitness for those who partake, and likely less automobile trips in the neighborhood, meaning reduced emissions originating from the neighborhoods in which people live. Bicycle traffic in lieu of automobile traffic also creates quieter and safer neighborhood streets. Finally, because they move at a slower rate of speed, allowing the cyclists to take in their surroundings as they travel, and don't require parking spots that are so hard to come by in Los Angeles, some business owners believe that bicycles help promote window-shopping and a local economy.

A Note About Funding:

A discussion of the various sources of funding for the 2010 Bicycle Plan warrants an exhaustive paper, as the plan relies on multiple sources of local and state financing in order to cover the costs of the facilities called for in the plan. This section only begins to scratch the surface of the mechanics with which the plan is being funded. What it does aim to do, however, is put into perspective the

seemingly large expenses required to implement the bike plan in relation to the amount of public money that Los Angeles regularly puts into the new construction and maintenance of automobile infrastructure with little question from taxpayers. Previous sections of this paper have noted the cost of various cycling facilities, and referred to some as relatively expensive (in relation to one another that is), though compared to automobile facilities they are remarkably affordable. Below are a choice few of a plethora of possible comparisons that help clarify how inexpensive bicycle infrastructure is compared to the cost of car infrastructure. The hope is that putting these costs side by side, arguments opposed to the bike plan that rely on the fiscal commitment the plan requires will be invalidated.

One fact so oft recited by cycling advocates across the country that is has become a mantra for many in the bicycle community is the cost of Portland's bike network. As has been reported numerous times, Portland constructed the initial 300 miles of its bicycle network for the same cost required to construct a one-mile segment of urban freeway.[33] If that relationship of infrastructural costs holds even close to true in Los Angeles, the expenditures of constructing the entire network proposed by the bike plan would be roughly equivalent to the cost of building six miles of urban freeway over the next 35 years. This comparison begs the question of what is more important for Los Angeles future; for example, the proposed expansion of the 710 Freeway or a comprehensive bicycle network?

Freeways are held especially dear in Los Angeles, especially since they support the trucks that service the ports of Los Angeles and Long Beach, which

represent a significant part of the regional economy, in addition to a host of other reasons. In order to put the cost of car and bike infrastructure in relation to each other using an example less vital to the region's economic engine, consider the cost of a former bike plan versus one grade (railroad) crossing. The entire budget of the largely unimplemented 1996/2002 Los Angeles Bicycle Plan was approximately 60 million dollars. To put this seemingly large number into perspective, a few years ago the city constructed a single railroad crossing on Valley Boulevard that cost approximately 100 million dollars, funded by Metro's Call for Projects campaign.[29] [34] Had Los Angeles been able to spare replacing a single railroad crossing, it would have been able to fund the entirety of the plan with ease. Though the above are just two examples of what could easily become a laundry list of comparisons, they do an adequate job of putting into perspective how affordable the aforementioned "expensive" cycling facilities and demonstrate that priorities, rather than funding, have been the cause for previous bike plans that have failed to be realized.

Bicycle Friendly Streets:

The 2010 Los Angeles Bike Plan introduces new bicycle facility designs in addition to improving the existing Backbone, Neighborhood and Green Networks. The new design concept presented in the plan is called Bicycle Friendly Streets, which are roadways that feature a number of innovative (for Los Angeles, at least) engineering designs for streets that discourage cut through vehicular traffic by implementing structures that reduce the volume and speed of traffic traveling on the road. In doing so, these streets are not made inaccessible to automobiles, but

rather, are made less desirable main arteries for motorists and more attractive thoroughfares for cyclists. Though Bicycle Friendly Streets are not explicitly bike boulevards, they are roadways that feature one or a combination of design elements often used on bike boulevards. (Figure 14) Additionally, Bicycle Friendly Streets are remarkably useful because they are not limited to one scenario, meaning that they can be implemented on streets that are part of the Backbone or Neighborhood Network. In order to better clarify what a Bike Friendly Street entails, a few of the primary designs that are mentioned in the Bike Plan's Technical Design Handbook are summarized in the following paragraphs.

One of the simples and most common sense measures outlined in the Technical Design Handbook to create Bicycle Friendly Streets is to create a chicane, increasing the distance a curb reaches out into the road to create a curved or S-shaped roadway. Simply making a straight street curved is remarkably effective in lowering the speed of cars traveling on the roadway. A proper chicane has two complimentary curbs, one on either side of the street, which extend out into the street in a way that forces traffic to make the aforementioned S-shape. (Figure 15) This measure is best implemented on a narrow street, as this design will force drivers to slow down in order to complete the two turns caused by the chicane. Though chicane construction may come at the cost of a few parking spaces on a roadway, they are more hospitable to emergency vehicle services than speed bumps to emergency vehicles and offer a unique opportunity for roadway beautification, as the added area between the old and new curb location can create a pocket park or small green space.[35]

Mini Roundabouts are another important feature of Bicycle Friendly Streets and are much like traffic circles. Roundabouts are implemented in lieu of intersections with four way stops, and rely on each direction of traffic to yield to traffic already in the roundabout. This helps eliminate cyclists and motorists alike from running stop signs at four way stop intersections. At a four way stop, individuals are more inclined to disobey the traffic indicators because every direction of traffic is required to stop – encouraging one party to take advantage of the obedient parties. At a roundabout, however, since no direction of traffic is informed to stop, each party approaching the intersection is encouraged to slow down to a near stop to ensure that their right of way is clear. Though Mini Roundabouts are somewhat expensive to construct (between $100,000 and $750,000 depending on the setting), they have been shown to greatly increase safety where implemented.[36] [37] Because roundabouts tend to only slow traffic at and approaching an intersection, they are best implemented in conjunction with a design like a chicane, which helps slow traffic mid-block.

Traffic diverters are another feature of Bicycle Friendly Streets that discourage cars from using them as through streets. There are two main types of traffic diverters, diagonal diverters designed for smaller, neighborhood streets and raised median diverters, which are better suited for instances where a Bicycle Friendly Street intersects a busier arterial street. A diagonal traffic diverter is typically a concrete median that divides an intersection diagonally, allowing automobile traffic to only proceed in one direction (either left or right) through the intersection. The diagonal median then has a paved path, generally slightly

narrower than the width of a standard car, allowing cyclists to travel straight through an intersection while cars cannot. (Figure 16) This design encourages motorists to utilize other, larger streets for through traffic. Raised median diverters are concrete medians constructed on two opposing sides of a four-way intersection. Similar to a diagonal diverter, the median diverters have cutouts wide enough to allow a cyclist through without allowing automobiles to travel through. Whereas a diagonal diverter discourages traffic from traveling along both streets affected, raised median diverters only discourage automobile traffic from using the Bicycle Friendly Street. Traffic diversion features are incredibly effective when implemented in the correct scenario, and are made even more appealing by their relatively inexpensive cost (between $4,000 and $10,000).[38] [39]

The final major component of Bicycle Friendly Streets is a loop detector. Loop detectors wire coils embedded in roadways at intersections that detect cyclists electromagnetically, cuing the traffic signal at the intersection to start its cycle. Presently, most intersections in Los Angeles do not have loop detectors sensitive enough to detect bicycles, meaning that a lone cyclist stopped at a red light does not trip the stoplight's cycle. As such, cyclists end up waiting at red lights until either a car joins them at the intersection or they push the pedestrian walk button at the intersection's corner. The effectiveness of the loop depends largely on its design, the details of which are illustrated in Figure 17. (Figure 17) Though state law (specifically AB 1581) now requires all new traffic signals to be made to detect bicycles, it is important that in the meantime Bicycle Friendly Streets are outfitted

with effective loop detectors in order to facilitate expedient movement of bicycles.[40] [41]

The Backbone Network:

As previously mentioned, the Backbone Network has, until recently, been the most emphasized part of Los Angeles bicycle planning, and as such, makes up a majority of the City's current bicycle network. Of the 378 miles that constitute the current network, 241 of these belong to the Backbone Network – 142 of which are bicycle lanes, and the remaining 99 of which are bike routes. The new Bike Plan approves the conversion of 81 of the current 99 miles of bike routes to bike lanes, in addition to the 433 miles of new bike lane construction it allows. Construction of a mere 15 new miles of bicycle routes is laid out in the plan, indicating that the new plan really is a document forged by planners and engineers as well as advocates and cyclists *that actually ride*. One major concern with the current Backbone Network that was mentioned earlier was the prevalence of bike routes (with or without sharrows) on high-traffic, high-speed roads where bike lanes are much appropriate. The new plan explicitly acknowledges this concern by drastically limiting the number of bike routes approved in the Backbone Network, instead showing preference for bike lanes.

The Backbone Network is primarily designed for more experienced or aggressive riders who are commuters or cycle as a primary form of transportation. As such, the network is largely in place on busy arterial streets with middling to high traffic levels and automobiles traveling at high speeds. Backbone Network streets

are designed to take cyclists to places of employment, entertainment, educational institutions and transit hubs – making them the highways of the bicycle network system. The infrastructural changes outlined in the current bike plan, however, will help make these busy roadways more hospitable to cyclists. The considerably expanded Neighborhood Networks that the plan calls for should provide a training ground for new or unconfident cyclists, allowing them to learn how to interact with traffic in a low-risk environment, eventually affording them the confidence to effectively utilize the busier Backbone Network.

The Neighborhood Network:

The Neighborhood Network, which, strictly in terms of mileage approved in the 2010 Bike Plan, is a top priority for receiving cycling infrastructure as it accounts for 834 of the 1678 miles of planned facilities. If the Backbone Network is the skeleton of Los Angeles' bicycle network, the Neighborhood Network is the system of ligaments that connect and attach the major Backbone segments to one another. Neighborhood Network infrastructure, of which a significant portion will be Bicycle Friendly Streets, is designed to promote ridership from all experience, age and ability levels. The reduced traffic and speeds promoted in the Neighborhood Network through a variety of methods (many of which were discussed in greater detail in the Bicycle Friendly Streets section) encourages people "to access neighborhood facilities including schools, libraries, shopping districts, and parks and open space" utilizing a bicycle, rather than an automobile, for short trips.[15]

The scant 73 miles of current Neighborhood Network is comprised of 44 miles of bike lanes, 25 miles of bike routes, and 4 recently constructed miles of Bicycle Friendly Streets. Future Neighborhood Network expansion focuses primarily on the construction of more Bicycle Friendly Streets, and relatively few bike routes, marking a commitment to more holistic bicycle treatments to streets rather than merely marking neighborhood roadways as cycling routes. All in all, the new plan calls for "83 miles of lanes, 36 miles of routes, and 643 miles of Bicycle Friendly Streets", which will effectively flesh out many of the existing gaps between arterials currently part of or designated to become Backbone Network facilities.[15] While the whole of the 2010 Bike Plan is ambitious, the pledge to tremendously expand the Neighborhood Network, specifically through the widespread proliferation of Bicycle Friendly Streets, is perhaps the most important component in terms of attracting new cyclists to Los Angeles' roadways and empowering them with the skills and confidence to consider their bicycles before their cars when traveling in the future.

The Green Network:

Though slated to have significantly less miles constructed than the two aforementioned networks in the 2010 Bike Plan, the Green Network remains the third vital network in Los Angeles's overarching bike network. The current 64 miles of Green Network facilities will be more than doubled with the addition of 75 new miles of future infrastructure. Green Network pathways are important to the City's bicycle network because of the multiple benefits they offer to cyclists. For some, the

Green Network, as mentioned in the section regarding bike paths, has the potential to serve as regional arteries that connect the bike networks of individual cities to each other. Other riders are afforded the benefit of riding in an environment even more natural and relaxed than Bicycle Friendly Streets that the Neighborhood Network offers. In either scenario, the paths of the Green Network are a welcome and necessary respite from traveling along roadways, and will hopefully help foster an appreciation for nature and green space to residents of a city that could certainly benefit from more natural settings.

While apparent in each network, the Green Network is rendered the most inoperative without the other networks, and serves as an important reminder that each of the three networks outlined in the bike plan relies on the others for their functionality and the success of the plan as a whole. Without the connecting links of the Neighborhood and Backbone Networks, the Green Network is largely symbolic, transporting cyclists from one complex of inhospitable streets to another. Likewise, without the Neighborhood Network, new or prospective cyclists may find the roadways leading to the Backbone Network too formidable and daunting to justify the trip. This interdependence of the various networks underscores the necessity of implementing all of the facilities proposed for each – failure to do so will render each significantly less effective. In order to ensure that the facilities outlined in the 2010 Bike Plan are actually constructed, and done so on the timeline indicated, a system of benchmarks and forums in which involved parties can be held accountable for their role in the plan have been established.

Accountability:

The 2010 Bike Plan, as has been noted, is certainly not the first bike plan that Los Angeles has seen. Previous bike plans, although approved by the requisite governing bodies for construction, have lacked the instruments of accountability necessary to ensure that they were carried out in a timely and comprehensive manner – the results of which have been the presently incomplete bicycle network and degraded morale from the advocates and associated parties that put the time and effort into making those plans. On this topic, Jay Slater, Chair of the newly invigorated Bicycle Advisory Committee (BAC) said, "Los Angeles had two great bike plans in the 1977 backbone bike plan and the 1996 bike plan. They both had great visions for the City, but neither of them got built. We're not going to sit by, after all the years of hard work that everyone has put into it, and let this plan fail like in years past."[42] In an effort to make good on this promise and to prevent history from repeating itself, the new plan designates two groups, the Bicycle Advisory Committee and the Bicycle Plan Implementation Team (BPIT), to collaborate with the departments involved in facility planning and construction, helping them address implementation problems and holding them accountable for carrying out their duties. Even with the appointment of these two groups to help ensure accountability, there is still concern about how effective they will be from many advocates involved in the creation of the plan, such as Joe Linton, who warns, "the plan is good, but leaves some hard decisions for implementation."[43] Though the

ability of these appointed groups to hold the Department of City Planning, Los Angeles County Department of Public Works and LADOT accountable will be unclear until the first five-year benchmark designated in the plan, below is a summary of the ways in which they intend to do so.

The primary roles of the BAC and BPIT will be to help provide a consensus on the implementation of specific facilities (making sure the design and location of a facility serves planners and cyclists alike), trouble-shoot problems that arise in the process of a specific project and act as forums that will improve interdepartmental communication. Though the BAC and BPIT have essentially the same stated goals, the way in which they achieve these ends will be done in distinctly different fashions.

The BAC will take a more hands-on approach to ensuring projects are on schedule and trouble shooting problems when they arise through the nascent liaison program, instituted on April 5th. The program designates each member of the BAC to serve as a point-person for the council district from which they have been appointed – in order to both keep the council informed about emerging bike related issues and to dialogue with council-specific entities like Chambers of Commerce, neighborhood councils, homeowners associations as well as the actual council member and staff. Since community support is essential, even from neighborhood to neighborhood, in the ease with which cycling facilities are implemented, it is essential that these liaisons take advantage of their ability to

"bridge the gap between City departments, the bicycling community, and the communities in their districts."[42]

BAC members will also have secondary liaison responsibilities, which will be to serve as liaisons to specific governmental departments and agencies involved in the planning and implementation of infrastructure. Thus far, 11 such agencies have been identified as part of this process. Whereas council district liaisons will be important in troubleshooting area-specific problems (i.e. in a potential circumstance where a neighborhood is opposed to one of their streets being converted to a bike boulevard), the agency liaisons will be important in holding each department accountable for their work. Liaisons will check on the progress of each agency, and should it be lagging, report back to the BAC about why, in order to elicit potential solutions from the committee as a whole.

The Bike Plan Implementation Team serves primarily as a forum, rather than a hands-on team like the BAC. Monthly BPIT meetings are important for inter-departmental dialogue, encouraging collaborative solutions, as the attendees of BPIT meetings include members from the Department of City Planning, LADOT and BAC as well as advocates and possibly council and Mayor's office representatives. These frequent meetings and representation of the majority of parties involved in implementing the plan will allow for a whole look at current progress, problems and the future of the 2010 Bike Plan.

The 2010 Bike Plan requires that the BPIT and BAC, in addition to the Department of City Planning, LADOT and related agencies, have to "report to the

Transportation Committee every quarter on the status of the bike plan."[21] Utilizing the information submitted to the Transportation Committee, the Department of City Planning will draft a yearly report identifying progress made, areas of concern and grants applied for by various departments, and the status of those grants (whether or not they were approved and why). Through this system of reporting, the hope is that the transparency it provides will help hold each individual party involved accountable for their part in implementing the plan, making each agency and committee serve watchdogs, rather than only having cycling advocates play that role.

While a transparent process that calls for multiple committees and interest groups to monitor the work of the agencies involved in implementing bicycle facilities, the system of accountability laid out in the bike plan suffers from having no explicit means of recourse for instances in which a department does not fulfill its designated responsibilities. Though the current plan creates a system of accountability more extensive than other bike plans that have come and gone with little to show as a result, without developing real, substantive penalties for agencies that fail to complete their commitments, the 2010 Bike Plan is still susceptible to the same fate as its predecessors. Perhaps a system of incentives that would freeze a portion of a negligent department's budget devoted to automobile-specific infrastructure until its bike plan obligations had been met, or a similar system could still be amended to the plan in the future. If agencies involved in implementing the plan knew that their ability to perform their other functions depended on

satisfactory fulfillment other their bicycle obligations, the likelihood of actually accomplishing their commitments would be greatly increased.

Recommendations

The 2010 Bicycle Plan is a multi-faceted and progressive document that proposes the beginnings of a new Los Angeles – one in which the future of the City's transportation is not centered solely on the automobile. The plan is a remarkably learned document, taking into account the strengths and weaknesses of specific cycling facilities, the shortcomings of Los Angeles' current bicycle network as a comprehensive unit and the means by which the changes called for in the document will be implemented and held accountable. In terms of specific facilities, the commitment to converting the bulk of existing bike routes into bike lanes and limiting the number of new bike routes approved shows a marked improvement in understanding what form of infrastructure promotes safety for cyclists. From the

perspective of the individual networks that constitute Los Angeles' bicycle network as a whole, the plan's emphasis on fleshing out the currently scant Neighborhood Network, specifically the pledge to construct a significant number of Bicycle Friendly Streets, demonstrates an understanding that safety in all settings – whether on a major arterial or a neighborhood street – is vital to increasing ridership from of types of prospective cyclists. Finally, the significantly improved systems of reporting and transparency of the implementation process provide methods by which parties involved in the plan's realization can be held accountable to their obligations – an important component lacking in previously approved Los Angeles bike plans.

Despite the marked improvements of this bike plan over its predecessors, the lack of authoritative systems of recourse for departments or agencies that do not fulfill their obligations outlined in the plan threatens to limit its overall effectiveness. This is especially alarming because the plan relies on such a large number of entities working cooperatively to fully realize the plan's vision, meaning that one negligent party would seriously impede the progress of the entire project. As developing a stricter system of accountability is unlikely at this point, or at least not feasible in the immediate future, below are a few key recommendations that will help increase the public profile of the plan, raise public support, and in turn, more accountability and a safer Los Angeles bicycle network.

Construct New Facilities as Rapidly as Possible:

The first recommendation seems intuitive enough, but it is simply to construct whatever facilities can be implemented with relative ease as soon as possible. This is not to say that bike routes, because they are the cheapest and easiest to install, should be substituted for arterials that are designated to become Bicycle Friendly Streets or bike lanes. Rather, within the guidelines of the plan, it is crucial that the Department of City Planning, the Department of Transportation and the County Department of Public Works work together to implement facilities as quickly as possible, starting with projects for which there is already sufficient public support and environmental reviews are not necessary prior to implementation. For one, this is essential because every mile of new bicycle infrastructure makes Los Angeles a safer place for cyclists to ride, and two, because with each additional segment of facilities installed, the public will almost certainly see increased ridership and the benefits cycling offers. The increased profile of bicycles helps legitimize them as a form of alternative transportation and will help garner further public support for the plan.

Remain Vigilant with Community Outreach Efforts:

Next, continued community outreach is essential to the long-term viability of the plan. Undoubtedly some neighborhoods will oppose having the travel lanes of one of their streets restricted or losing parking along a section of roadway. For this reason, it is essential that cyclists as a whole, not just Bicycle Advisory Committee liaisons, serve as representatives to their block, neighborhood or council district –

not only in speech but also in action. It is essential that cyclists reinforce to their neighbors, local business owners and council representatives the positive benefits of cycling in addition to keeping them up to date on the bike plan, its implications for their neighborhood and listening to and addressing concerns that people may have about increased bicycle activity. While this is important, it is of equal significance that cyclists remain good representatives for the cycling in their actions on the street. Deviant behavior such as disobeying rules of the road and riding in a manner that is intentionally inflammatory to others on the road do tremendous damage both for the legitimacy of the bicycle as a form of transportation and public support for implementing further cycling infrastructure. The viability of the plan's implementation not just 5 or 10 years down the road, but 20 and 25 years ahead depends largely on continued public support, and since much of the public are currently car owners and drivers, fostering healthy relationships on the road are paramount to its success.

Develop Stricter Systems of Accountability:

The final substantive recommendation to ensure long-term success for the 2010 Bike Plan would be to develop a more stringent method with which to hold individual departments and agencies accountable for their part in implementing the facilities called for by the plan. Though it has been mentioned a number of times in this paper, this recommendation warrants repetition because it truly is the weakest component of the plan in its current form. The present plan is full of high-minded rhetoric about future parity between automobiles and bicycles in Los Angeles and

lays out ambitious goals for the city, dictating that an average of 40 miles of cycling infrastructure be constructed annually in a city that has never managed to implement more than an average of 12.1 miles per year after the approval of previous plans. Though it may not be feasible to develop such a system that each agency involved in the implementation of the plan will agree to in the first, second or even fifth year of the plan (the first big benchmark), it is essential that one be drafted and approved at some point in order to ensure the plan's enduring viability.

Los Angeles' 2010 Bicycle Plan is a progressive document that contains a template for a city decidedly different in terms of its commitment to a future transportation system that is not strictly focused on the automobile. The tremendously expanded bicycle network, and the comprehensive design of that network outlined in the plan, supports the increased use of bicycles in addition to multi-modal use of public transportation – whether the bus or train. By creating cycling infrastructure that compliments these other modes of transportation, Los Angeles will take another significant step toward developing a more inclusive alternative transportation network that serves the entire region of Southern California. Though it has a few notable vulnerabilities, the new bike plan addresses many of the concerns that prevented previous bike plans from being fully realized, and as such, represents a safer and smoother future for cyclists in Los Angeles.

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Appendix of Figures

Figure 1: A typical bike lane.

Figure 2: Bike lane on Sunset Boulevard heading west from Echo Park to Silverlake

Figure 3: A green bike lane – common in many US cities

Figure 4: Proper placement of a bike lane adjacent to right hand turn lane

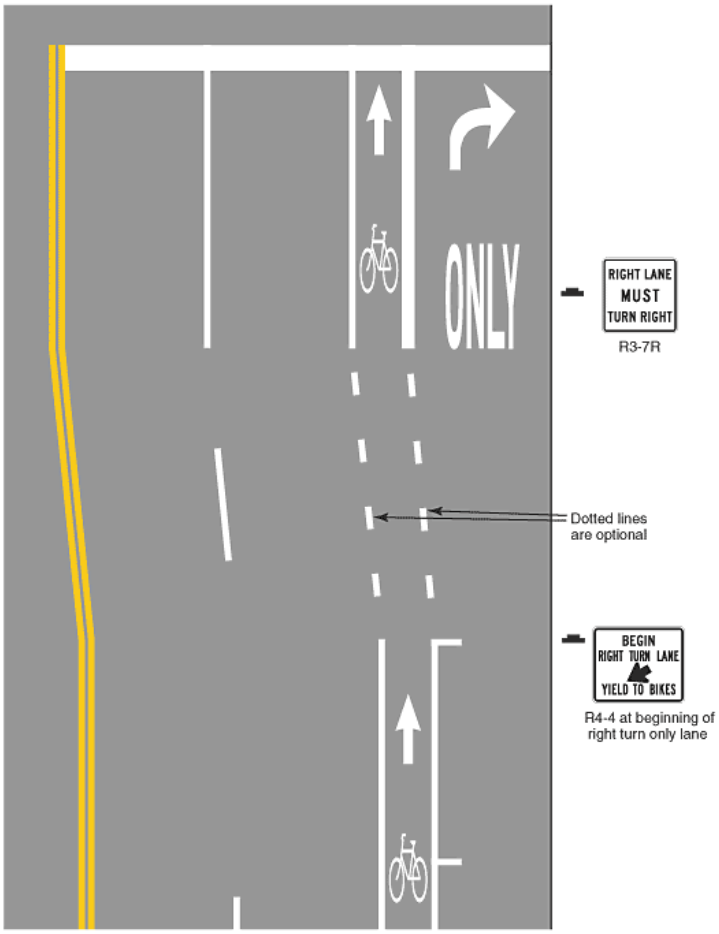


Figure 5: Example of "coffin corner" bike lane design

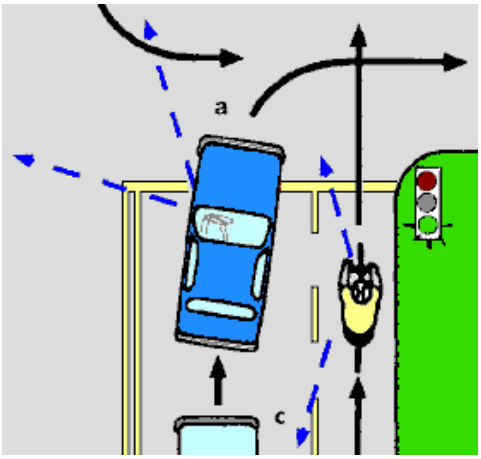


Figure 6: Diagram of 44-foot roadway after the addition of two bike lanes

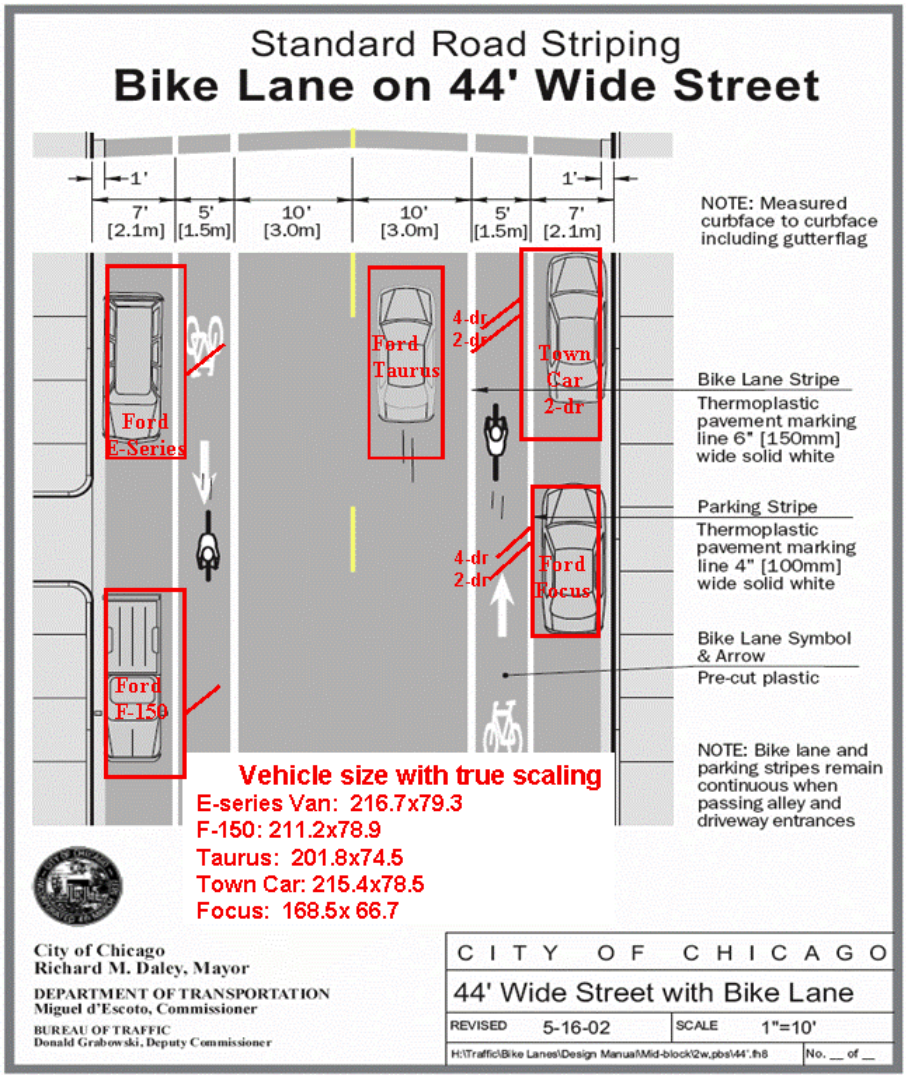


Figure 7: Diagram of a typical physically separated bike lane

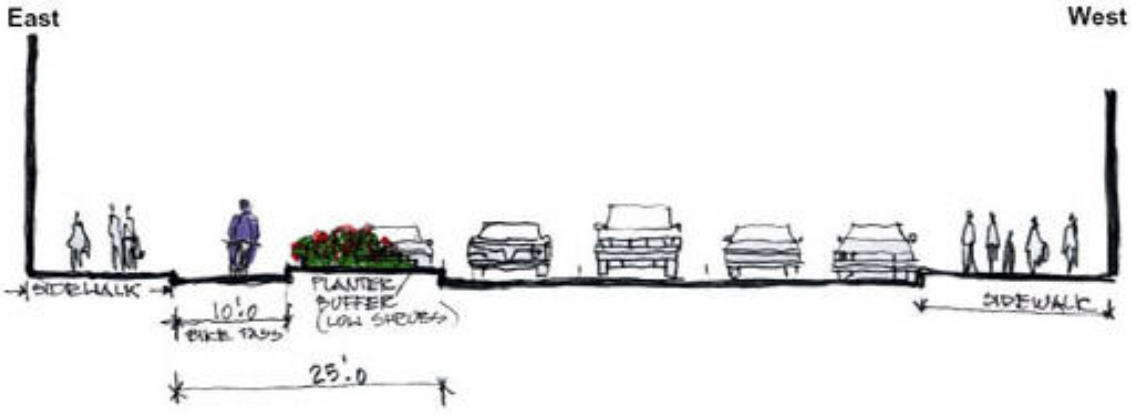


Figure 8: Diagram of a scenario in which a right hand turn from a motorist is especially dangerous for a cycling on a physically separated bike lane

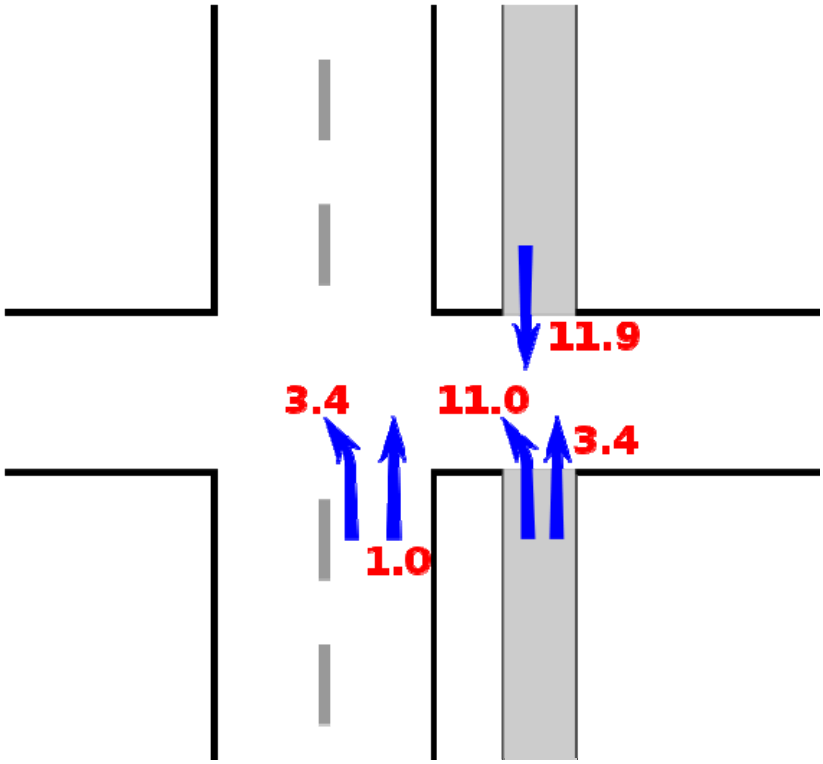


Figure 9: A properly installed and utilized sharrow

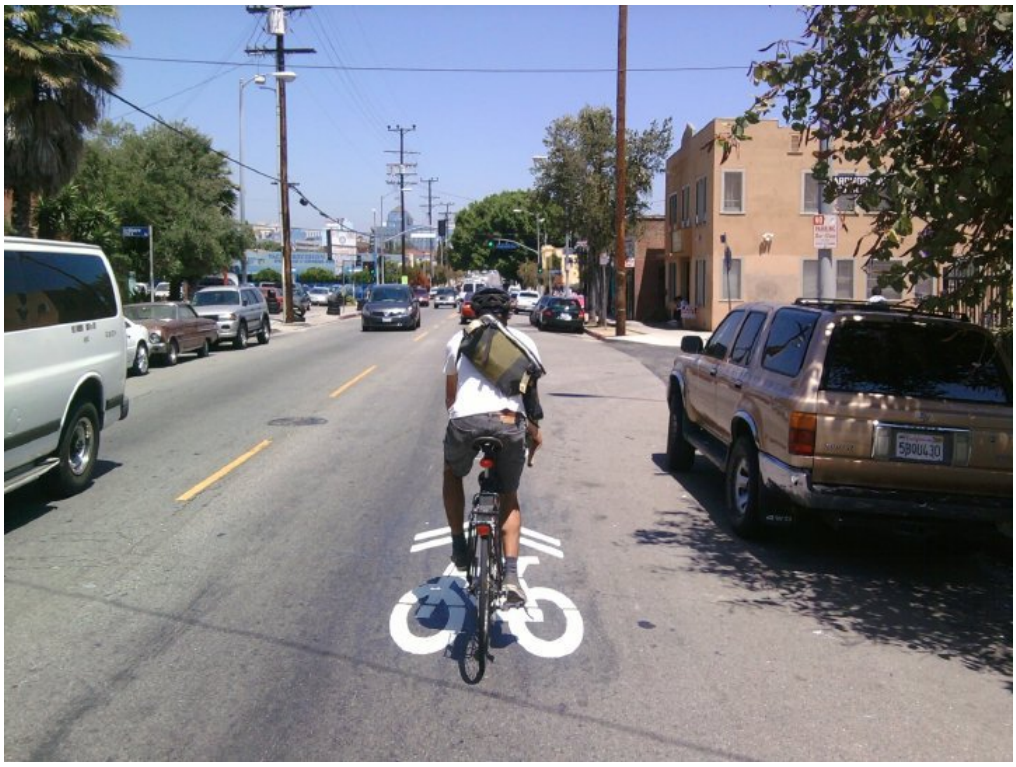


Figure 10: A bike boulevard in Berkeley, CA

Figure 11: An ideal street pattern for implementation of a bike boulevard

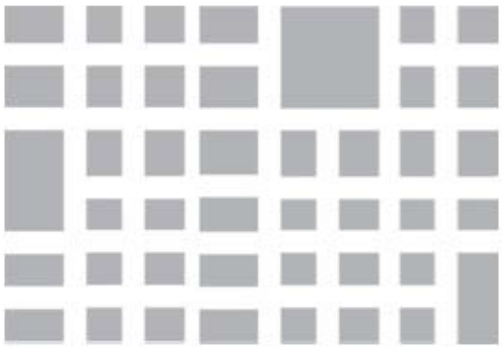


Figure 12: A street pattern commonly found in suburbs – not well suited for the addition of a bike boulevard due to lack of substitutable thoroughfares

Figure 13: A typical bike path along a natural feature

Figure 14: A Bicycle Friendly Street featuring a host traffic calming design elements

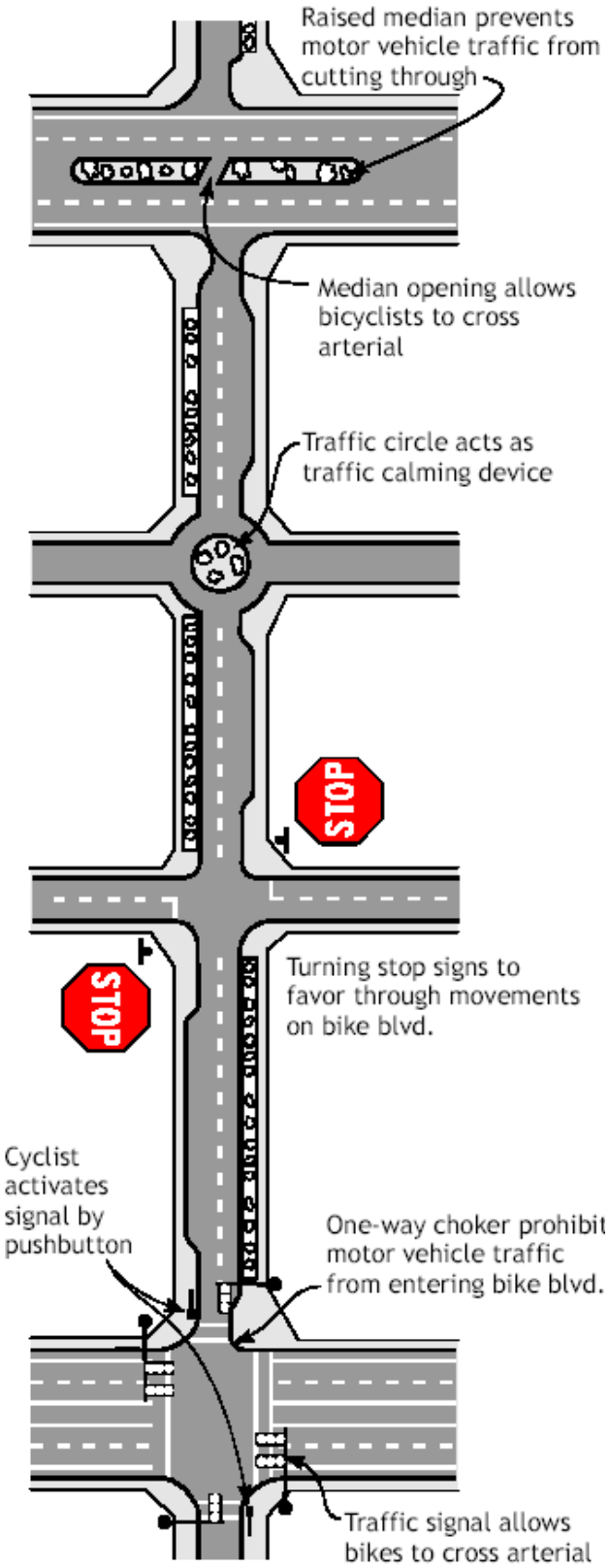


Figure 15: A chicane created by curb extensions

Figure 16: A diagram of a diagonal traffic diverter

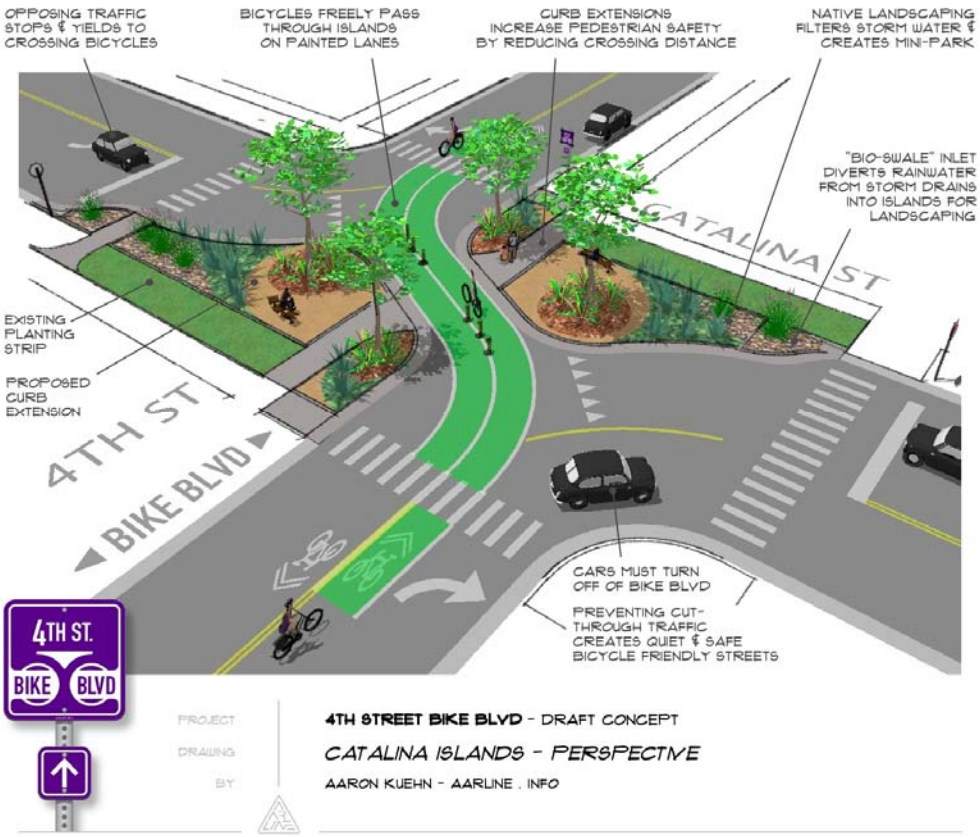
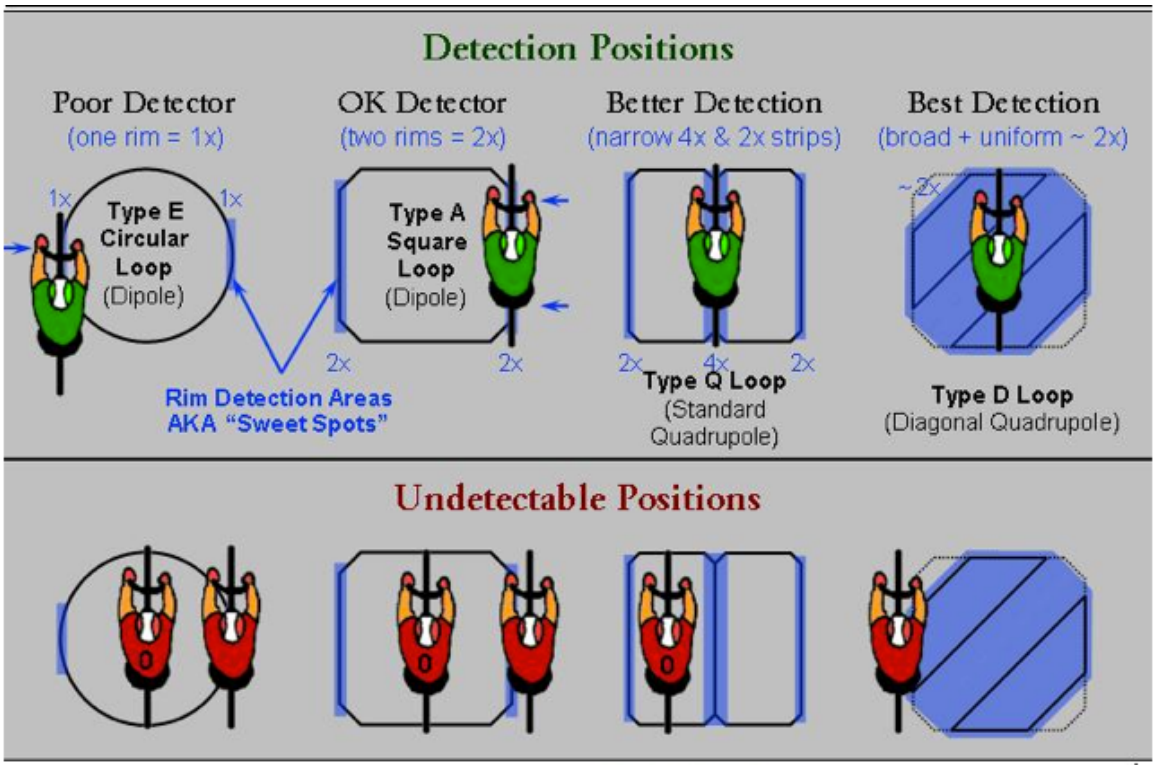


Figure 17: Various types of loop detectors and their effectiveness


Detection Positions
Poor Detector
(one rim = 1x)
OK Detector
(two rims = 2x)
Better Detection
(narrow 4x & 2x strips)
Best Detection
(broad + uniform ~ 2x)
1x
1x
Type E
Circular
Loop
(Dipole)
Type A
Square
Loop
(Dipole)
2x
2x
2x
4x
2x
~2x
Rim Detection Areas
AKA "Sweet Spots"
Type Q Loop
(Standard
Quadrupole)
Type D Loop
(Diagonal Quadrupole)
Undetectable Positions